IVY TECH APHY 101 – MUSCLE SYSTEM PRACTICE TEST (SAMPLE)

STUDY GUIDE



SAMPLE STUDY GUIDE WITH LIMITED QUESTIONS

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Introduction

Preparing for a certification exam can feel overwhelming, but with the right tools, it becomes an opportunity to build confidence, sharpen your skills, and move one step closer to your goals. At Examzify, we believe that effective exam preparation isn't just about memorization, it's about understanding the material, identifying knowledge gaps, and building the test-taking strategies that lead to success.

This guide was designed to help you do exactly that.

Whether you're preparing for a licensing exam, professional certification, or entry-level qualification, this book offers structured practice to reinforce key concepts. You'll find a wide range of multiple-choice questions, each followed by clear explanations to help you understand not just the right answer, but why it's correct.

The content in this guide is based on real-world exam objectives and aligned with the types of questions and topics commonly found on official tests. It's ideal for learners who want to:

- Practice answering questions under realistic conditions,
- Improve accuracy and speed,
- Review explanations to strengthen weak areas, and
- Approach the exam with greater confidence.

We recommend using this book not as a stand-alone study tool, but alongside other resources like flashcards, textbooks, or hands-on training. For best results, we recommend working through each question, reflecting on the explanation provided, and revisiting the topics that challenge you most.

Remember: successful test preparation isn't about getting every question right the first time, it's about learning from your mistakes and improving over time. Stay focused, trust the process, and know that every page you turn brings you closer to success.

Let's begin.

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How to Use This Guide

This guide is designed to help you study more effectively and approach your exam with confidence. Whether you're reviewing for the first time or doing a final refresh, here's how to get the most out of your Examzify study guide:

1. Start with a Diagnostic Review

Skim through the questions to get a sense of what you know and what you need to focus on. Your goal is to identify knowledge gaps early.

2. Study in Short, Focused Sessions

Break your study time into manageable blocks (e.g. 30 – 45 minutes). Review a handful of questions, reflect on the explanations.

3. Learn from the Explanations

After answering a question, always read the explanation, even if you got it right. It reinforces key points, corrects misunderstandings, and teaches subtle distinctions between similar answers.

4. Track Your Progress

Use bookmarks or notes (if reading digitally) to mark difficult questions. Revisit these regularly and track improvements over time.

5. Simulate the Real Exam

Once you're comfortable, try taking a full set of questions without pausing. Set a timer and simulate test-day conditions to build confidence and time management skills.

6. Repeat and Review

Don't just study once, repetition builds retention. Re-attempt questions after a few days and revisit explanations to reinforce learning. Pair this guide with other Examzify tools like flashcards, and digital practice tests to strengthen your preparation across formats.

There's no single right way to study, but consistent, thoughtful effort always wins. Use this guide flexibly, adapt the tips above to fit your pace and learning style. You've got this!

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Questions

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1. Which connective tissue surrounds each muscle fiber?

A. Endomysium

B. Perimysium

C. Epimysium

D. Fascia

2. Which energy system dominates during a 20-second sprint?

A. Aerobic glycolysis

B. Phosphagen (ATP-CP) system

C. Aerobic oxidative phosphorylation

D. Lipolysis

3. Which muscle is the prime mover for elbow flexion?

A. Triceps brachii

B. Deltoid

C. Biceps brachii

D. Latissimus dorsi

4. After Na+ channels close, which phase describes the membrane becoming more negative as K+ leaves the cell?

A. Repolarizing phase

B. Depolarizing phase

C. Hyperpolarization

D. Plateau phase

5. What term describes the electrical signal that rapidly depolarizes and repolarizes the muscle cell membrane and propagates along the sarcolemma and into T-tubules?

A. Action potential

B. End-plate potential

C. Depolarization

D. Graded potential

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6. Which subunits compose troponin and their roles?

A. Troponin A binds Ca2+; Troponin B inhibits cross-bridge; Troponin D binds actin.

B. Troponin C binds tropomyosin to block binding sites.

C. Troponin C binds Ca2+; Troponin I inhibits actin-myosin interaction when Ca2+ is low; Troponin T binds tropomyosin to actin.

D. Troponin C inhibits actin; Troponin I binds Ca2+; Troponin T displaces tropomyosin.

7. Which region is the light area consisting of thin filaments only?

A. A band

B. I band

C. H zone

D. Z disc

8. Which muscle tissue is primarily responsible for generating heat, especially during skeletal activity?

A. Skeletal muscle tissue

B. Cardiac muscle tissue

C. Smooth muscle tissue

D. Nervous tissue

9. Which chemical transmitter stimulates skeletal muscle by binding to receptors on the muscle cell?

A. Acetylcholine

B. Norepinephrine

C. Dopamine

D. Serotonin

10. Which contraction occurs when the muscle generates tension but does not shorten because the external load is greater than the force produced?

A. Isometric contractions

B. Isotonic contractions

C. Treppe

D. Fused tetanus

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Answers

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1. A
2. B
3. C
4. A
5. A
6. C
7. B
8. A
9. A
10. A

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Explanations

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1. Which connective tissue surrounds each muscle fiber?

A. Endomysium

B. Perimysium

C. Epimysium

D. Fascia

The connective tissue that surrounds each muscle fiber is the endomysium. This thin, delicate sheath envelops every single muscle cell, creating a microenvironment that includes capillaries and satellite cells for repair. The endomysium helps transmit the force produced by the fiber to the surrounding tissue and supports nutrient exchange. By contrast, the perimysium wraps groups of fibers into fascicles, the epimysium surrounds the entire muscle, and fascia refers to broader connective tissue layers outside the muscle. So the endomysium is the layer that directly surrounds individual muscle fibers.

2. Which energy system dominates during a 20-second sprint?

A. Aerobic glycolysis

B. Phosphagen (ATP-CP) system

C. Aerobic oxidative phosphorylation

D. Lipolysis

In short, high-intensity, short-duration efforts rely on the fastest way to make ATP without using oxygen. The phosphagen system uses stored ATP and phosphocreatine to resynthesize ATP at a very high rate, giving quick power for rapid bursts. For a 20-second sprint, this rapid, non-oxygen-dependent source supplies the majority of the ATP early on, supporting the maximal effort when you need power now. Lipolysis is too slow to contribute meaningfully in a sprint, and aerobic pathways (aerobic glycolysis and oxidative phosphorylation) are slower and don't match the rapid ATP turnover required. So the ATP-CP (phosphagen) system is the best fit for powering a 20-second all-out sprint.

3. Which muscle is the prime mover for elbow flexion?

A. Triceps brachii

B. Deltoid

C. Biceps brachii

D. Latissimus dorsi

Elbow flexion is driven most strongly by the biceps brachii, especially when the forearm is supinated (palm facing up). The biceps crosses the elbow joint and attaches to the radius, so when it contracts it pulls the forearm up toward the upper arm, bending the elbow. It's a two-joint muscle that also helps with forearm supination and shoulder actions, but its primary role in bending the elbow—particularly in the common testing position—is as the main flexor. The other muscles listed don't bend the elbow; triceps brachii extends the elbow, while deltoid and latissimus dorsi mainly act on the shoulder and back, not the elbow. Therefore, the most effective elbow flexor in this context is the biceps brachii.

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4. After Na+ channels close, which phase describes the membrane becoming more negative as K+ leaves the cell?

A. Repolarizing phase

B. Depolarizing phase

C. Hyperpolarization

D. Plateau phase

Repolarization is the phase where the membrane potential returns toward the negative resting value after depolarization. When Na+ channels close, the inward current drops, and K+ channels open, allowing positively charged K+ to leave the cell. This outflow makes the inside more negative, reversing the earlier positive shift and bringing the cell back toward its resting potential. Hyperpolarization would occur if K+ continued to leave past the resting level, and the plateau phase is a separate phase seen in heart muscle involving Ca2+ influx. Depolarization is the preceding phase driven by Na+ entry that makes the cell more positive.

5. What term describes the electrical signal that rapidly depolarizes and repolarizes the muscle cell membrane and propagates along the sarcolemma and into T-tubules?

A. Action potential

B. End-plate potential

C. Depolarization

D. Graded potential

The signal described is the action potential. It is an electrical impulse that rapidly depolarizes and then repolarizes the muscle cell membrane and travels across the sarcolemma, continuing into the T-tubules so the interior of the muscle fiber is reached. This propagation is an all-or-none event driven by voltage-gated ion channels: sodium channels open to depolarize, then potassium channels help repolarize, allowing the impulse to travel along the entire membrane and into the T-tubule system to trigger calcium release and contraction. This differs from an end-plate potential, which is a local, not-to-be-confined depolarization at the neuromuscular junction caused by acetylcholine binding. It can initiate an action potential but it itself does not propagate along the membrane into the T-tubules. Depolarization describes the process of membrane potential becoming less negative, which is part of the action potential but does not capture the traveling, all-or-none nature. Graded potentials are variable, decremental signals that occur locally and do not reliably propagate to induce the full muscle fiber response.

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6. Which subunits compose troponin and their roles?

A. Troponin A binds Ca2+; Troponin B inhibits cross-bridge; Troponin D binds actin.

B. Troponin C binds tropomyosin to block binding sites.

C. Troponin C binds Ca2+; Troponin I inhibits actin-myosin interaction when Ca2+ is low; Troponin T binds tropomyosin to actin.

D. Troponin C inhibits actin; Troponin I binds Ca2+; Troponin T displaces tropomyosin.

The troponin complex on the thin filament has three subunits with distinct roles that together regulate contraction in response to calcium. Troponin C is the calcium-binding subunit, acting as the calcium sensor. Troponin I is the inhibitory subunit; when calcium is low, it helps keep the actin-myosin binding sites blocked, preventing contraction. Troponin T anchors the complex to tropomyosin on actin, positioning the regulatory unit so tropomyosin can cover or uncover the myosin-binding sites as needed. When calcium rises during excitation, calcium binds to Troponin C, causing a conformational change that reduces Troponin I's inhibition and shifts tropomyosin away from the myosin-binding sites, exposing them for cross-bridge cycling. This exact arrangement—Ca2+ binding by Troponin C, inhibition by Troponin I, and Tropomyosin-binding and anchoring by Troponin T—is why the described roles in this option are the correct ones. Other descriptions use non-existent subunit names or assign incorrect functions, so they don't fit the actual troponin complex.

7. Which region is the light area consisting of thin filaments only?

A. A band

B. I band

C. H zone

D. Z disc

The light region that contains only thin filaments is the I band. It lies between two Z discs and is made up mainly of actin filaments (thin fibers) with no thick myosin filaments overlapping in that space, which is why it looks lighter under a microscope. In contrast, the A band contains the entire length of thick filaments and the overlapping thin filaments, and the central part of the A band—the H zone—has only thick filaments. During contraction, actin filaments slide inward, shortening the I band while the A band stays the same length.

8. Which muscle tissue is primarily responsible for generating heat, especially during skeletal activity?

A. Skeletal muscle tissue

B. Cardiac muscle tissue

C. Smooth muscle tissue

D. Nervous tissue

Heat production during activity mainly comes from the energy your muscles use to contract. Skeletal muscle, which you actively move with, has the highest rate of ATP turnover during exercise and makes up most of your body's mass, so it generates the most heat as a byproduct of contraction. When ATP is used to power cross-bridge cycling, some of that energy becomes mechanical work and some is released as heat, which is why your body warms up during vigorous activity and why shivering (rapid, repeated skeletal-muscle contractions) is a powerful heat-generating mechanism. Cardiac muscle and smooth muscle also consume energy, but their contractions aren't driving skeletal activity, so their heat contribution in this context is much smaller. Nervous tissue uses energy for signaling, but it isn't the tissue primarily responsible for generating heat associated with skeletal movement.

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9. Which chemical transmitter stimulates skeletal muscle by binding to receptors on the muscle cell?

A. Acetylcholine

B. Norepinephrine

C. Dopamine

D. Serotonin

Skeletal muscle contraction at the neuromuscular junction is triggered when a chemical messenger from the motor neuron binds to receptors on the muscle cell. The transmitter in this case is acetylcholine. It binds to nicotinic acetylcholine receptors on the motor end plate, which are ligand-gated ion channels. When acetylcholine binds, these channels open and allow sodium ions to rush into the muscle cell (with some potassium leaving), depolarizing the membrane and generating an action potential that travels into the muscle. This electrical signal then prompts the release of calcium from the sarcoplasmic reticulum, leading to contraction. Acetylcholine is quickly broken down by acetylcholinesterase, which ends the signal. Norepinephrine, dopamine, and serotonin don't directly bind to receptors on skeletal muscle to trigger contraction. They act on different receptors in the nervous system or other tissues, so they don't produce the direct muscle depolarization needed at the neuromuscular junction.

10. Which contraction occurs when the muscle generates tension but does not shorten because the external load is greater than the force produced?

A. Isometric contractions

B. Isotonic contractions

C. Treppe

D. Fused tetanus

When a muscle can generate tension but does not shorten because the external load is greater than the force produced, the fibers are activated yet the overall length stays the same. This is an isometric contraction. In this situation, the sarcomeres don't shorten—the joint angle doesn't move—even though cross-bridges are forming and force is being developed to try to overcome the load. The key point is that the load prevents movement, so length remains constant while tension rises. This differs from isotonic contractions, where the muscle changes length as it moves a load—shortening during a concentric action or lengthening during an eccentric action—because the tension is enough to move the resistance. Other options describe different phenomena: Treppe is the gradual increase in force with successive stimuli due to calcium buildup, and fused tetanus is a smooth, continuous contraction from high-frequency stimulation, not specifically about maintaining length under a heavy load.

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Next Steps

Congratulations on reaching the final section of this guide. You've taken a meaningful step toward passing your certification exam and advancing your career.

As you continue preparing, remember that consistent practice, review, and self-reflection are key to success. Make time to revisit difficult topics, simulate exam conditions, and track your progress along the way.

If you need help, have suggestions, or want to share feedback, we'd love to hear from you. Reach out to our team at hello@examzify.com.

Or visit your dedicated course page for more study tools and resources:

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We wish you the very best on your exam journey. You've got this!

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